ATTACHMENT 1

Excerpts from earlier Catena Comments

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matters of	)	
	)	
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147
	)	
and	)	
	)	
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98

COMMENTS OF CATENA NETWORKS, INC.

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The Problem with POTS Splitters in RTs

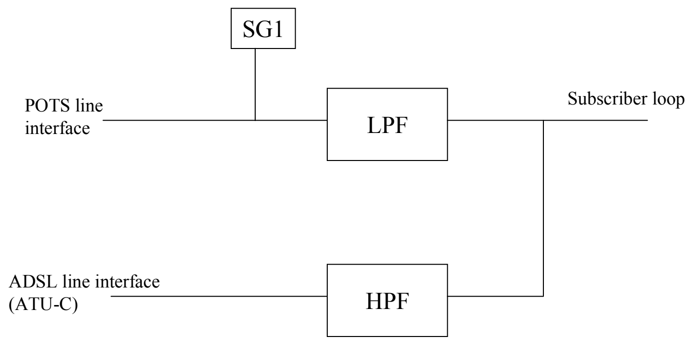
Line Sharing Test Access Implications on POTS Splitters

Another problem with simply extending the current CO model to remote terminals is the continuation of a POTS Splitter as the demarcation point for line sharing.

While the POTS Splitter provides effective separation of the high and low frequency paths, it introduces many undesirable problems. These problems include:

- multiple wires to/from the wiring panel
- large size and high cost because of the utilization of large, bulky capacitors and magnetics

Figure 3 shows the basic elements of the traditional POTS Splitter. LPF is a low pass filter that couples the low frequency POTS spectrum onto the subscriber loop (0 to 4 kHz). HPF is a high pass filter that couples the high frequency DSL spectrum onto the subscriber loop (typically 30 kHz to 1.1 MHz). SG1 is a signature that indicates that a POTS splitter is present on the line when an appropriate DC test is performed by the test head connected to the POTS test bus.



Traditional POTS splitter

Figure 3

The traditional splitter proved to be an effective way to allow the addition of ADSL data service by a CLEC to the traditional voice service provided by the ILEC for initial deployments. However, the splitter introduces several problems when one considers the operational concerns to both the ILEC running a reliable voice network, as well as the CLEC running a reliable data network.

The traditional POTS Splitter introduces several problems that need to be resolved to implement test access for line sharing as required by the Commission. These include:

- The HPF in the traditional POTS splitter implements blocking capacitors that limits test access to high frequencies only, and the HPF eliminates the ability to perform DC and low-frequency tests. These tests are necessary to detect extraneous voltages on the tip and ring leads, as well as capacitive or resistive faults between tip, ring and ground.

- Tests performed by the Competitive LEC at DC and low frequencies could interfere with lifeline POTS services provided by the Incumbent LEC. This could affect either in-service calls or the availability of service. The CLEC test equipment must be able to determine when a line is in use for POTS service and not test the line if the line is in use for POTS. This detection becomes very difficult in the case where a POTS line is performing on-hook transmission and a large drop in DC voltage due to an off-hook condition cannot be sensed on the loop.

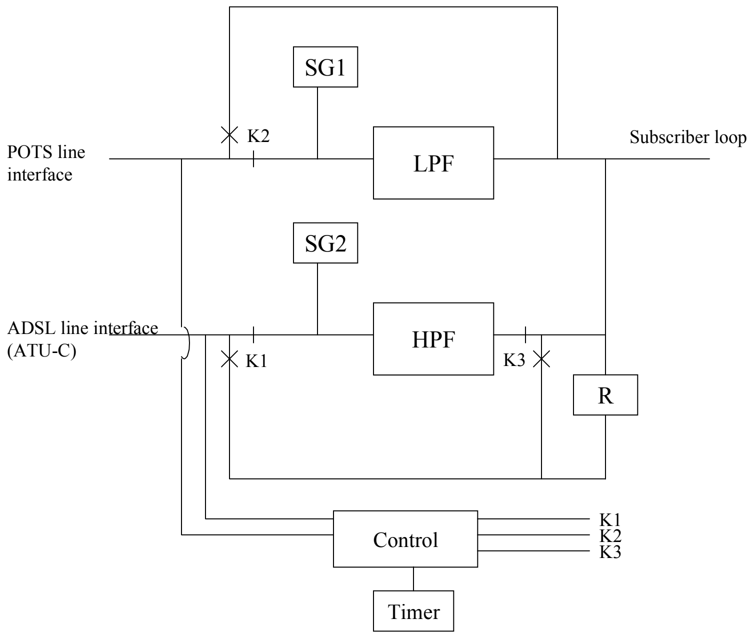
- To ensure that POTS service is provided after testing or if a failure of the test equipment occurs, a time-out feature must be implemented for CLEC test access.

A complete list of the desired line sharing test access requirements can be found in the Sprint contribution to the T1E1.4 working group of Committee T1-Telecommunications (Contribution T1E1/2000-266, "Line Sharing Test Access Requirements"):

> "In a line-shared environment, CLECs must be able to fully test their data network. At the same time, ILECs must be assured of the integrity of their voice service, as well as have test access to the network for spectrum management troubleshooting. Any line-sharing test access solution must also be relatively simple to implement and be cost effective. This contribution proposes requirements for line sharing test access. These requirements can be used as a basis for defining a standard architecture for line sharing test access:
>
> - The CLEC must have the ability to gain full bandwidth access to a shared loop from a remote location.
>
> - The ILEC must have the ability to gain full bandwidth access to a shared loop for interference isolation.
>
> - The CLEC must be able to detect if the voice line is off-hook. This monitoring must be non-intrusive to the voice line.
>
> - The CLEC must be able to verify connectivity from the collocation area to the customer premises.
>
> - The CLEC must be able to remove the ILEC-supplied battery and ground from the loop to perform testing.

- DC blocking capacitors must be disconnected from the loop during CLEC testing.
- The CLEC must be able to perform basic DC tests; loop length, balance and presence of load coils.
- The CLEC must be able to access the shared loop to examine loop characteristics using a Time Domain Reflectometer (TDR).
- The CLEC must be able to access the shared loop to perform spectrum analysis using a wide-band noise test set.
- Intrusive CLEC loop testing must be completed within a timeout period. The timeout period must be adjustable and extendible within limits, (e.g. minimum of 30 seconds to maximum of 5 minutes).
- If a power failure or control failure occurs during CLEC testing, normal POTS operation must be restored within a pre-set time period.
- Normal POTS operation must be restored upon the failure of test access components.
- The POTS splitter must not require powering.
- Loop test access must be compatible with existing POTS splitter chassis and wiring.
- Loop test access must provide "equal access" to any number of CLECs.
- Remote test access on non-shared lines must be secure.
- Test technologies that have already been deployed must be utilized to the extent possible.

To address these requirements, vendors have proposed many different solutions. In general, the requirements drive one towards a solution that adds many functional elements to the traditional POTS Splitter. A block diagram of a possible solution addressing many of the above requirements is shown in Figure 4.



"Smart" POTS Splitter to support line sharing test access requirements

Figure 4

The elements that are incremental to those in the traditional POTS Splitter are:

- SG2, which is a signature that the CLEC test head can detect to determine the presence of a POTS splitter

- K2, which provides the ILEC with a short circuit across the LPF to allow full spectrum access to the subscriber loop

- K1, which allows the CLEC test head to unobtrusively monitor the subscriber loop through a high impedance (R) to determine if the POTS line is in use

- K3, which, when operated with K1, provides the CLEC with a short circuit across the HPF to allow full spectrum access to the subscriber loop (including DC)

- A control block, which controls the relays identified above in response to control signals from either the ILEC or CLEC test heads (controlled via longitudinal signals from the test head)

- A timer to ensure that in a time-out scenario, all relay contacts are released so that the lifeline POTS service can be restored

A "Smart" POTS Splitter, like that pictured above, is one of the many solutions being proposed to address the operational problems identified. All line-sharing test access solutions share the common theme of adding additional complexity to the POTS Splitter and ILEC/CLEC test heads. The addition of more complexity to the POTS Splitter makes it even larger and more costly than the traditional POTS Splitter. This additional size may be tolerable (although undesirable) in the central office environment, but in the remote cabinet, it is not feasible.

Direction of Technology Innovation and Standards

Enabling of Future Services with Full Frequency Spectrum Splitterless Integrated POTS + DSL Deployments

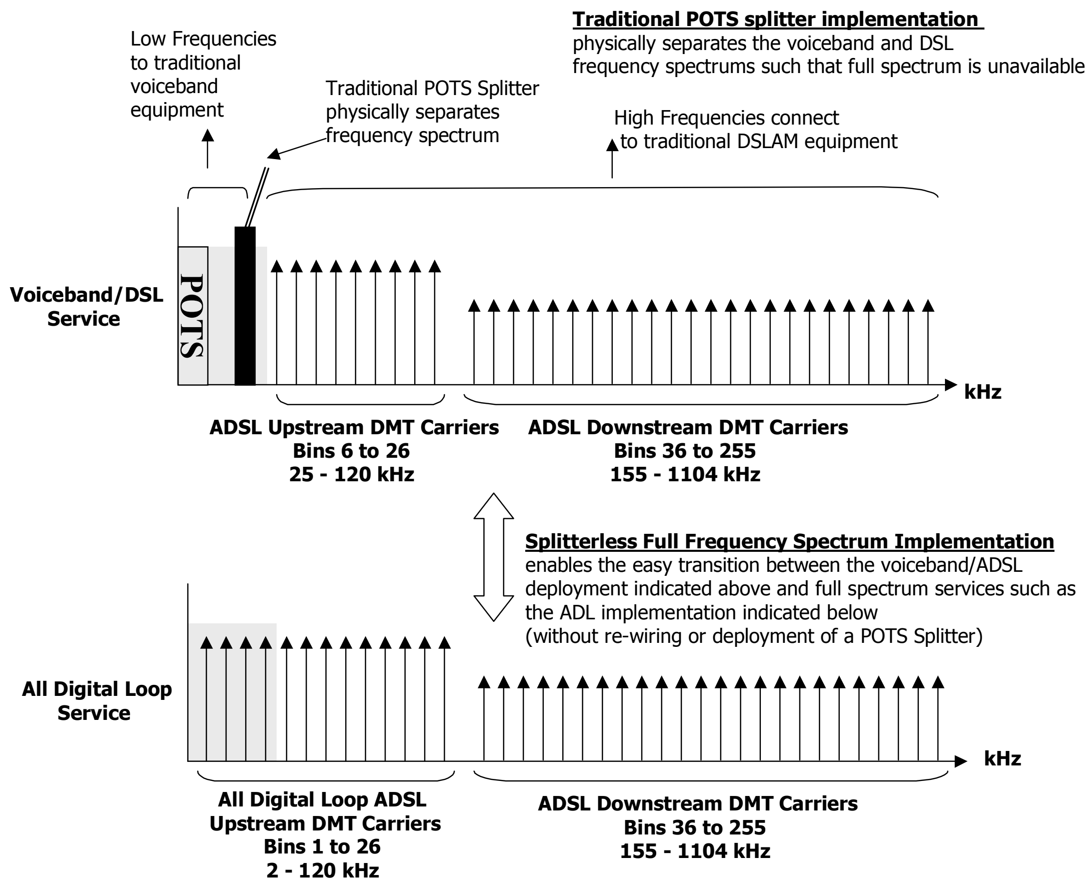
Today's typical deployments of Central Office-based access equipment include physical "POTS Splitters" which partition the access loop frequency spectrum. Low frequencies are connected to traditional voiceband equipment and high frequencies are connected to traditional DSLAM equipment. This approach impedes the efficiency of evolution to future services.

A full-frequency spectrum splitterless connection to next-generation integrated POTS + DSL linecards enables a simple evolution from today's analog POTS service to various existing, or newly evolving, services. The built-in POTS splitting function of the next-generation POTS + DSL linecards results in the operator being able to simply switch between services that require a POTS Splitter function, and those that do not. Evolving services are enabled without having to install/remove a physical POTS splitter and/or the associated wiring.

Various new services, which require access to the full frequency spectrum, are gaining momentum. A few examples of these new services are G.shdsl and the All Digital Loop (ADL) version of ADSL. Such technologies will be deployed soon. G.shdsl specifications are nearing completion at the ITU, T1E1.4 and other standards bodies, and much other work has been completed.

- ITU-T Study group question 4/15 G.shdl specification is G.991.2
- The All Digital Loop (ADL) version of ADSL is also being progressed at the ITU, T1E1 and other standards bodies
- ITU-T Study group question 4/15 ADSL specification is ITU G.DMT.bis (evolution of G.992.1)
- ITU Contributions D.730, MA-069, MA-076R1, NG-034, NG-079R1, NT-116, FI039, FI-090, HC-035, HC-036 relate to ADL
- T1E1.4 contributions 0e141790, 0e141800 and 0e142550 relate to ADL

The evolution of full-frequency spectrum splitterless access loop technologies is expected to continue.



Frequency Spectrum Implementations

Figure 5

These advances in technology will greatly enhance the capacity of advanced broadband services. However, mandating continued use of a POTS Splitter (particularly at remote terminals) would negate these advances. Furthermore, any regulatory policy requiring the use of POTS Splitters will strand 27 KHz of precious, non-renewable spectrum. The Commission must be careful not to implement a regulatory policy that impedes technology innovation, prevents exciting new services and strands prime bandwidth.